Space Weather Forecast

Issued on Sunday, 07 May 2023 at 13:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1-R2 Radio Blackouts throughout. Low confidence coronal mass ejection arrivals day 1 (07 May) bring a likelihood of G1-G2 Minor/Moderate storms, with a chance of G3/Strong Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only common class flares observed, the largest at 06/2157UTC from a small sunspot region in in the southeast disc. There are a trio of spot groups spanning the northeast to north-centre disc. The middle, and smallest one of these is perhaps the most interesting as it has an unusual (opposite) polarity for a northern hemisphere spot for this solar cycle, however this has recently declined a little. Furthermore some small growth and development of small spots has been seen around the other the other two regions, resulting in increased complexity, however these currently remain stable. There are three further small and magnetically simple spots including the spot which produced the largest flare. Multiple CMEs (coronal mass ejections) were observed on the 06 May, however analysis shows no Earth directed components.

Solar Wind / Geomagnetic Activity: The solar wind showed the waning influence of a CME and declining connection to the fast winds from a coronal hole. Observed speeds declined from elevated at around 500-550km/s to be slightly elevated at 400-450km/s. The total magnetic field strength was initially Moderate, before easing to Background from 06/2200 UTC. The north-south, Bz, component was variable and largely weak through the period. Geomagnetic activity was Quiet to Unsettled with an isolated Active interval (Kp2-4) 06/1200-06/1500 UTC. .

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: A chance of Moderate activity is expected through the next four days, mainly from the regions in the northeast to north-centre disc.

Solar Wind / Geomagnetic Activity: Two CMEs which left the Sun on 04 and 05 May respectively, are forecast to arrive on day 1 (07 May), perhaps concurrently, with a risk of effects into 08 May. Confidence is low with their speeds, and how much material will be within them, giving a low confidence to the geomagnetic forecast. Otherwise current slightly elevated solar winds are expected to gradually ease through the period, once any CME influence has passed. Generally Quiet to Unsettled conditions are expected at first day 1 (07 May). Any CME arrivals are likely to bring a spell of G1-G2 Minor to Moderate storms, with a chance of G3 Strong storms. This could lead to some visible aurora from latitudes as low as northern England, but this is very low confidence. This risk recedes later day 2 (08 May) with activity becoming mainly Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to persist at background levels with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	70	10	1
Strong	G3	No	25	20	1	1
Severe	G4	No	2	2	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	55	55	55	55
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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